

Claims

What is claimed is:

1. A power system comprising:
an electric motor being operable to power a hydraulic pump;
at least one hydraulic cylinder being fluidly connected to the hydraulic pump and defining a first fluid volume and a second fluid volume separated from one another via a moveable plunger;
a variable displacement hydraulic motor being fluidly connected to at least the first fluid volume defined by the hydraulic cylinder and being operable to power a generator; and
a power storage system operably coupling the generator to the electric motor.
2. The power system of claim 1 wherein the power storage system includes a fuel cell, an electrolysis device and a hydrogen storage device.
3. A work machine comprising a work machine body; and
the power system of claim 1 being attached to the work machine body.
4. The work machine of claim 3 including an implement attached to the work machine body; and
the at least one hydraulic cylinder being operably coupled to move the implement.
5. A power system comprising:
means for converting hydraulic power produced within at least one hydraulic cylinder to mechanical power via a variable displacement hydraulic motor;

means for converting the mechanical power to electrical power;
means for storing the electrical power;
means for supplying an electric motor coupled to a hydraulic pump with the stored electrical power; and
means for supplying hydraulic fluid, via the hydraulic pump, to the at least one hydraulic cylinder.

6. The power system of claim 5 wherein the means for storing electrical power includes a fuel cell, an electrolysis device and a hydrogen storage device.

7. The power system of claim 5 wherein the at least one hydraulic cylinder being operably coupled to move a work machine implement.

8. A method of operating an electrical power system, comprising the steps of:
powering a generator, at least in part, by converting hydraulic power produced within a hydraulic cylinder to mechanical power via a variable displacement hydraulic motor;
storing electrical power created by the generator within a power storage system;
powering a hydraulic pump, at least in part, by supplying electrical power from the power storage system to an electric motor coupled to the hydraulic pump; and
supplying hydraulic fluid to the hydraulic cylinder, at least in part, by operating the hydraulic pump.

9. The method of claim 8 wherein the step of powering the generator includes a step of producing hydraulic power by retracting a plunger within a hydraulic cylinder.

10. The method of claim 9 wherein the step of producing hydraulic power includes a step of controlling a speed of the retracting plunger, at least in part, by varying the displacement of the motor.

11. The method of claim 8 wherein the step of storing includes a step of producing hydrogen within a reformer.

12. The method of claim 8 wherein the step of storing includes a step of creating hydrogen and oxygen within an electrolysis device from electrical power generated by the generator.

13. The method of claim 12 wherein the step of storing includes a step of absorbing the hydrogen in a hydrogen storage device.

14. The method of claim 13 includes a step of powering a hydraulic pump includes a step of re-producing electrical power, at least in part, by combining the hydrogen with oxygen in a fuel cell.

15. A power system comprising:
a variable displacement hydraulic motor being configured to power a generator;
a power storage system being configured to store electrical power produced by the generator;
an electric motor being configured to power a hydraulic pump with the electrical power from the power storage system; and
a hydraulic cylinder being configured to receive hydraulic fluid from the hydraulic pump and to produce hydraulic power that drives the variable displacement hydraulic motor.

16. The power system of claim 15 wherein the power system includes a fuel cell, an electrolysis device and a hydrogen storage device.

17. The power system of claim 15 wherein the at least one hydraulic cylinder being operably coupled to move a work machine implement.